NOTES ON *XENODERMICHTHYS COPEI* (GILL, 1884) (PISCES : ALEPOCEPHALIDAE)

by

Fernando P. CARVALHO (1) and Armando J. ALMEIDA (2)

ABSTRACT. - Body proportions, photophore distribution and meristic data on *Xenodermichthys copei* (Gill, 1884) are presented and compared with previous descriptions of this species. Carefull observations revealed the presence of small ring-like modified scales along the lateral line. The existence of these scales in a species until now described as scaleless has implications on the identification keys for the Alepocephalidae family.

RÉSUMÉ. - Les auteurs ont mis en évidence la présence d'écailles modifiées en anneaux, tout le long de la ligne latérale de *Xenodermichthys copei* (Gill, 1884). L'existence de ces écailles, jusqu'alors considérées comme inexistantes chez cette espèce, remet en question les clés d'identification actuellement disponibles pour les espèces de la famille des Alepochephalidae. Les proportions du corps, la distribution des photophores et les données méristiques sont présentées et comparées avec celles qui sont indiquées par d'autres auteurs.

Key-words : Alepocephalidae, *Xenodermichthys copei*, Taxonomy.

Xenodermichthys copei (Gill, 1884) is a common species in all productive areas of the Atlantic Ocean and it is also known in the Indian and Pacific Ocean (Vaillant, 1888 ; Collett, 1896 ; Zugmayer, 1914 ; Beebe, 1933 ; Maurin, 1968 ; Quéro, 1977 ; Badcock and Larcombe, 1980 ; Markle and Quéro, 1984).

The *Xenodermichthys* genus, created by Günther (1878), was based on a provisional diagnosis of a single specimen collected during the "Challenger" expedition in the Indian ocean. This specimen was described as *X. nodulosus*. A more detailed account of the genus was presented a few years later by Günther (1887). The first description of specimens from the Atlantic Ocean was given by Gill (1884) under the name of *Aleposomus copei*. Gill's holotype was fully redescribed and pictured by Goode and Bean (1896), but in spite of the earliest account on the species, the most used description and name, for many decades, were those from Vaillant (1888), under the name *X. socialis*. For a complete list of synonyms see Krefft (1973) and for the prevailing name see Markle (1978).

During the following decades an increasing number of *X. copei* specimens were caught in different Atlantic regions and those received more or less detailed descriptions, basically in agreement with the Vaillant's description (Collett, 1896 ; Zugmayer, 1914 ; Quéro, 1977). Also in recent identification guides and reviews the same basic description of the species was kept virtually unchanged (Rey, 1947 ; Albuquerque, 1954-56 ; Bauchot and Pras, 1980 ; Markle and Quéro, 1984).

MATERIAL AND METHODS

Observations by the authors of the present note on several specimens of *X. copei* offered the opportunity to notice that some important specific characteristics

(1) Laboratorio Nacional de Engenharia e Tecnologia Industrial, Departemento de Proteccao e Segurança Radiologica - Estrada Nacional 10, P-2685 Sacavem - PORTUGAL.
(2) Departemento de Zoologia e Antropologia (Laboratorio Maritimo da Guia) - Faculdade de Ciencias de Lisboa - Rua Escola Politecnica - 1200 Lisboa - PORTUGAL

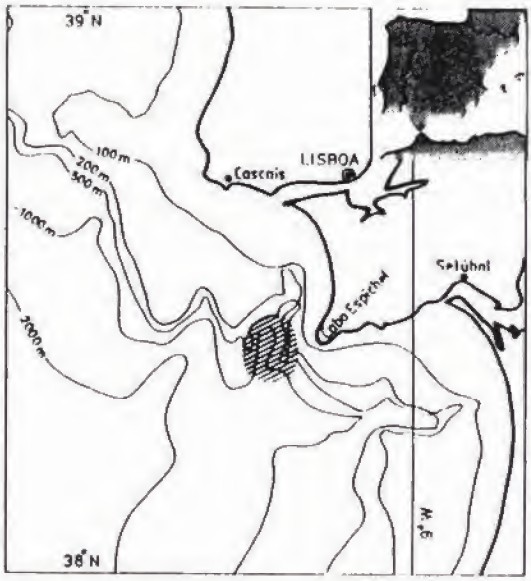

Fig. 1 : Capture of *Xenodermichthys copei* (Gill, 1884) : traced area.

Table I : Body proportions of *Xenodermichthys copei* (Gill, 1884) in percentages of standard length and head length.

Standard length (Sl) mm	87.2	103.6	126.0	123.0	96.0	105.0	115.0	123.0	127.0
Head length (Hl) mm	23.3	27.7	30.3	32.0	21.7	25.0	25.0	29.0	27.0
Hl / Sl	26.7	26.7	24.0	26.0	22.6	23.8	21.7	23.6	21.3
Preanal length / Sl	62.4	65.1	61.9	63.8	60.4	64.7	-	-	64.0
Predorsal length / Sl	62.6	63.5	64.7	61.0	63.5	69.5	61.7	65.0	64.6
Largest height / Sl	19.6	20.7	21.1	18.2	22.3	20.5	21.7	18.9	21.6
Distance from snout to origin of anal fin / Sl	65.5	67.5	63.9	66.8	64.8	65.6	69.6	68.3	65.0
Dorsal fin (length of the base) / Sl	32.1	31.0	29.0	30.8	26.0	24.8	30.4	28.8	29.1
Preorbital length / Hl	15.9	14.4	14.5	16.6	23.5	17.2	21.2	22.4	22.2
Interorbital / Hl	13.3	14.8	13.9	15.0	8.8	12.0	13.2	15.2	12.2
Diameter of eye / Hl	39.5	37.2	36.6	33.1	33.2	40.4	45.2	36.2	42.2

were missing in the papers above referred.

Nine specimens, preserved in 5 % formalin, were examined. All of them came from the same area off Cape Espichel, south of Lisbon (Fig. 1) and were caught, at different depths, between 300 and 1100 m. Four specimens belong to the collection of "Aquario Vasco de Gama" (Lisbon) and five belong to the collections of "Museu Bocage" (Fac. of Sciences of Lisbon).

Observations included body measurements on preserved specimens, photophore countings under dissection microscope and vertebrae centra counting on X-ray radiographs.

RESULTS

Body proportions : Specimens have standard lengths comprised between 87-127 mm and weigths comprised between 8.2-18.7 g. Mean body proportions are presented in Table I. One important feature is the large variance in some parameter relationships, denoting the low morphometrics in *X. copei*. Those variances come from alepocephalids soft body.

The wide range of those relationships is consistent with the meristic relationships reported previously and explains the discrepancies among different authors who described *X. copei*.

Fin rays and vertebra centra : All fin rays are segmented. D 27-30, A 28-29, P 7, V 6, C55. Vertebrae centra number is 48-49. These observations are in good agreement with recent data (Markle, 1978) but do not accomodate with all ancient descriptions.

Photophores : All observed specimens have photophores in a quincuncial arrangement. Photophores are better observed in old preserved specimens than in fresh preserved ones, due to the loss of the skin black coloration. Being quite numerous (there are more than 500 photophores on the whole body) their enumeration would be practically impossible without a methodology for their grouping in series and lines. Photophores grouping in series along the body was accounted through the medium ventral line, each photophore being the first in the series around the body and antero-dorsally directed (Fig. 2). The number of series along the body is constant, as well as the number of photophores on the head region (40 on the left side) (Fig. 2 and Table II).

Our observations are in agreement with the only previous account given by Badcock and Larcombe (1980). Both results put in evidence the constant distribution pattern of photophores in *X. copei* within very narrow limits.

Lateral line and scales : The lateral line is not always easily observable in *X. copei* and its absence has often been claimed. Otherwise a consensus exists among all descriptions about the scaleless body of this species, even in the most recent studies (Best and Bone, 1976 ; Markle, 1978).

Lateral line lies along body between dorsal and ventral muscular masses and describes an arch at the cephalic region. This arch branches into a circum-orbital and a pre-opercular under jaw archs (Fig. 2). Pores are visible in tubes of the lateral-line system. Carefull observation revealed that although the skin is actually naked, lateral-line scales are always present. Scales are ring-like modified, embedded in the integument and support the lateral-line tube (Fig. 3). The widest part of the scale is turned towards the lateral muscle and firmly attached to the conjunctive tissue layer while its distal tips are free. Scales are absent in the cephalic-line tubes, but along the body lateral line they are around 60.

DISCUSSION

The above account on body proportions, meristics and photophores of *X. copei*, confirms the current description of the species. However, lateral-line system of *X. copei* possesses small ring-like scales, unnoticed up to the present time since this species has been persistently described and identified among alepocephalids as scaleless. Nevertheless, the existence of those scales is not unique in this family.

Table II : Photophores series in *Xenodermichthys copei* (Gill, 1884). Each series is enumerated along the body by the most ventral photophore. Photophores on the head and on the fins are extensively enumerated. (LS - left-hand side ; Rs - right-hand side).

Photophores groups	Number of photophores or series							Badcock and Larcombe, 1980
Standard length (mm)	87.2	103.6	96.0	105.0	115.0	123.0	127.0	"typical adults"
Head photophores :								
dorso nasal (Dn)	1	1	1	1	1	1	1	1
ventro nasal (Vn)	1	1	1	1	1	1	1	1
Postorbital (Po)	2	3	3	3	3	3	3	3
Suborbital (Sub)	4	4	4	4	5	4	4	4
Upper preopercular (Up)	3	3	3	3	3	3	3	3
Lower opercular (LP)	4	4	4	4	4	4	4	4
Latero dorsal opercular (OpD)	6	6	6	6	6	6	6	6
Latero ventral opercular (OpV)	9	8 ?	9	9	9	9	9	9
Branchiostegal (Br) - Ls ; Rs	5 ; 4	5 ; 4	5 ; 4	5 ; 4	5 ; 4	5 ; 4	5 ; 4	5 ; 4
Mandibular (Md)	3	3	3	3	3	3	3	3
Symphysial lower jaw (SO)	1	1	1	1	1	1	1	1
Body photophores (series) :								
Prepectoral (midventral (PpV))	3	2	3	2	3	1	3	2 - 3
Prepectoral (lateral (Ppl))	3	3	3	3	3	2	3	3
Pectoral to ventral fin base (PV)	7	7	7	7	7	7	7	usually - 7
Ventral to anal fin base (VA)	4	4	4	4	3	4	4	4
Over anal fin base (Ao)	10	10	10	10	13	10	10	10 - 13
Peduncle (Aop)	3	3	4	3	4	4	3	usually - 4
Caudal fin base (Prc) (procurrent rays)	2 ?	5	2	2	2	2	-	5
Fin photophores :								
Pectoral - Ls ; Rs	-	-	2 ; 3	1 ; 1	- ; 2	- ; 1	2 ; 2	2 - 4 (< 8)
Pelvic - Ls ; Rs	-	-	2 ; 5	3 ; 3	4 ; 5	2 ; 3	2 ; 3	< 8
Dorsal - one row	-	-	17	18	16	-	15	< 15
Anal - one row	-	-	17	14	16	-	-	< 17
Caudal - one side	-	-	> 25	-	-	-	-	-

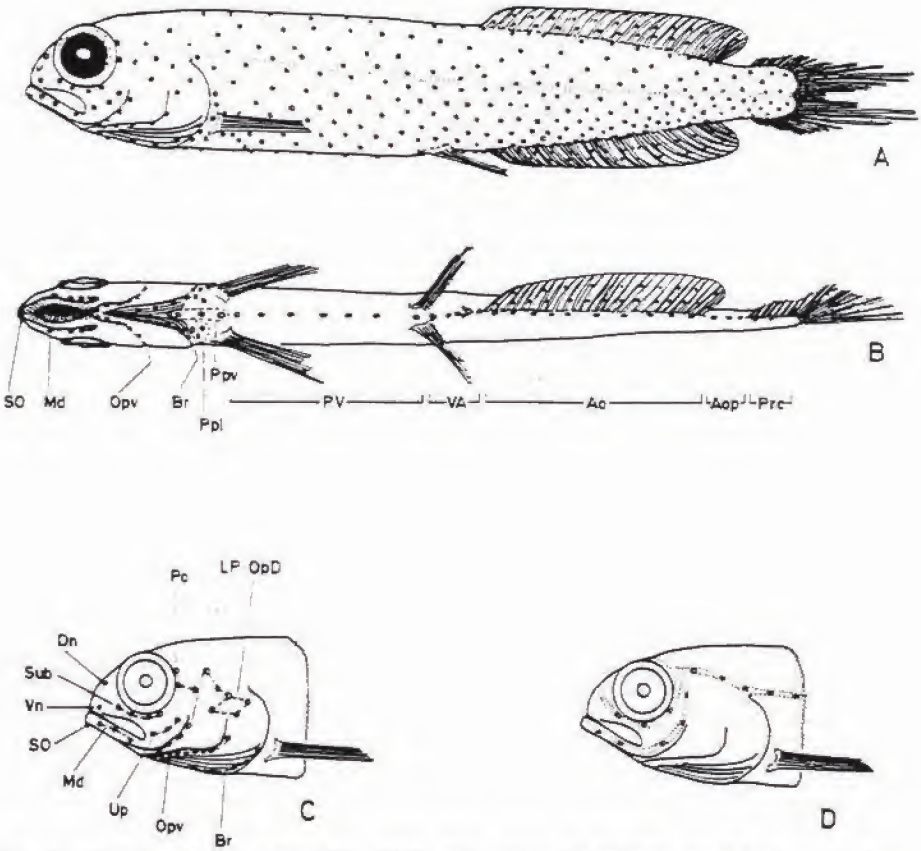

Fig. 2 : *Xenodermichthys copei* (Gill, 1884), adult stage. Photophores are not at scale. A : Photophore arrangement along body and head, lateral view; B : ventral view of the body with most-ventral photophores; C : photophore groups on the head; D : cephalic archs of the lateral line system with pores. For abrevations see Table II.

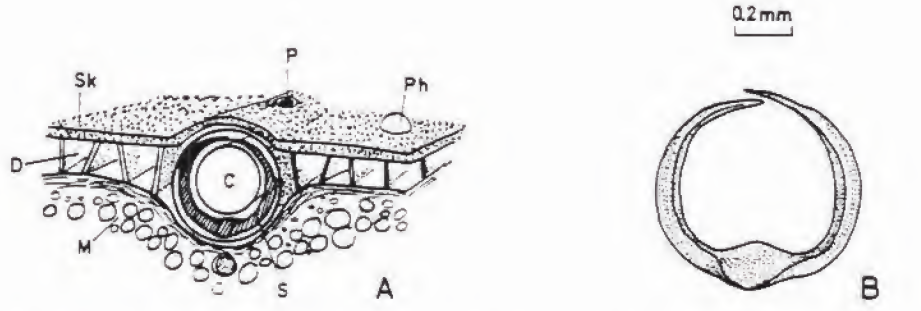

Fig. 3 : Lateral-line section of *Xenodermichthys copei* (Gill, 1884). A : Integument structure; B : lateral-line scale, frontal view; C : lateral-line canal; D : sub-dermal compartment system; M : muscle (partially based on Best and Bone, 1976); P : pore; Ph : photophore; S : lateral-line scale; Sk : skin.

Ring-like modified scales restricted to the lateral line also exist in *Rouleina maderensis* Maul, 1948 and *R. attrita* (Vaillant, 1888) (Maul, 1948 ; Markle, 1978). This feature renders the *Xenodermichthys* genus more closely related to other alepocephalid genus and surely it has implications on identification keys for diagnosis within the Alepocephalidae.

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